



1

SEQUENCE LISTING

<110> ENGELHARDT, DEAN L.
STAVRIANOPOULOS, JANNIS G.
RABBANI, ELAZAR
DONEGAN, JAMES J.

<120> IN VITRO PROCESS FOR PRODUCING MULTIPLE NUCLEIC ACID COPIES

<130> ENZ-52(D2) (C) (D1)

<140> 10/713,183

<141> 2003-11-14

<150> 10/260,031

<151> 2003-06-06

<150> 09/302,816

<151> 1998-03-03

<150> 08/182,621

<151> 1994-01-13

<160> 27

<170> PatentIn Ver. 3.3

<210> 1

<211> 7249

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic M13mp18
nucleotide sequence

<400> 1

```
aatgctacta ctattagtag aattgatgcc accttttcag ctgcgcgccc aaatgaaaat 60
atagctaaac aggttattga ccatttgcca aatgtatcta atgggtcaaac taaatctact 120
cgttcgcaga attgggaatc aactgttaca tggaatgaaa ctccagaca ccgtacttta 180
gttgcatatt taaaacatgt tgagctacag caccagattc agcaattaag ctctaagcca 240
tccgcaaaaa tgacctctta tcaaaaggag caattaaagg tactctctaa tccgtacctg 300
ttggagtttg cttccggtct ggttcgcttt gaagctcgaa ttaaaacgcg atatttgaag 360
tctttcgggc ttctctctaa tctttttgat gcaatccgct ttgcttctga ctataatagt 420
cagggtaaaag acctgatttt tgatttatgg tcattctcgt tttctgaact gtttaaagca 480
tttgaggggg attcaatgaa tatattatgac gattccgcag tattggacgc tatccagtct 540
aaacatttta ctattacccc ctctggcaaa acttcttttg caaaagcctc tcgctatttt 600
ggttttttatc gtcgtctggt aaacgagggt tatgatagtg ttgctcttac tatgcctcgt 660
aattcctttt ggcgttatgt atctgcatta gttgaatgtg gtattcctaa atctcaactg 720
atgaatcttt ctacctgtaa taatgttggt ccgttagttc gttttattaa cgtagatttt 780
tcttccaac gtctgactg gtataatgag ccagttctta aaatcgcata aggtaattca 840
caatgattaa agttgaaatt aaaccatctc aagcccaatt tactactcgt tctgggtgtc 900
tcgtcagggc aagccttatt cactgaatga gcagctttgt tacgttgatt tgggtaatga 960
atatccgggt cttgtcaaga ttactcttga tgaaggctag ccagcctatg cgcctgggtc 1020
gtacaccgtt catctgtcct ctttcaaagt tggtcagttc gggtccctta tgattgaccg 1080
tctgcgcctc gttccggcta agtaacatgg agcaggtcgc ggatttcgac acaatttatc 1140
aggcgatgat acaaattctcc gttgtacttt gtttcgcgct tgggtataatc gctgggggtc 1200
aaagatgagt gtttttagtgt attctttcgc ctctttcgtt ttaggttggt gccttcgtag 1260
```

tggcattacg	tattttaccc	gtttaatgga	aacttccctca	tgaaaaagtc	tttagtcctc	1320
aaagcctctg	tagccgttgc	taccctcggt	ccgatgctgt	ctttcgctgc	tgagggtgac	1380
gatcccgcaa	aagcggcctt	taactccctg	caagcctcag	cgaccgaata	tatcggttat	1440
gcgtgggcga	tggttgttgt	cattgtcggc	gcaactatcg	gtatcaagct	gtttaagaaa	1500
ttcacctcga	aagcaagctg	ataaacccgat	acaattaaaag	gctccttttg	gagccttttt	1560
ttttggagat	tttcaacgtg	aaaaaattat	tattcgcaat	tccttttagtt	gttcctttct	1620
attctcactc	cgctgaaact	gttgaaaagt	gtttagcaaa	accccataca	gaaaattcat	1680
ttactaacgt	ctggaaagac	gacaaaactt	tagatcggtta	cgctaactat	gaggggtgtc	1740
tgtggaatgc	tacaggcggt	gtagtttgta	ctggtgacga	aactcagtg	tacggtacat	1800
gggttcctat	tgggcttgct	atccctgaaa	atgagggtgg	tggctctgag	ggtggcggtt	1860
ctgagggtgg	cggttctgag	ggtggcggtta	ctaaacctcc	tgagtacggt	gatacaccta	1920
ttccgggcta	tacttatatc	aacctctctg	acggcactta	tccgcctggt	actgagcaaa	1980
accccgctaa	tcctaactct	tctcttgagg	agtctcagcc	tcctaatact	tctatgtttc	2040
agaataaata	gttccgaaat	aggcaggggg	cttaactgt	ttatacgggc	actgttactc	2100
aaggcactga	ccccgttaaa	acttattacc	agtacactcc	tgtatcatca	aaagccatgt	2160
atgacgctta	ctggaacggt	aaattcagag	actgcgcttt	ccattctggc	tttaatgaag	2220
atccattcgt	ttgtgaatat	caaggccaat	cgtctgacct	gcctcaacct	cctgtcaatg	2280
ctggcgggcg	ctctggtggt	ggttctggtg	gcggctctga	gggtggtggc	tctgagggtg	2340
gcggttctga	gggtggcgcg	tctgaggggag	gcggttccgg	tgggtgctct	ggttccgggtg	2400
atthtgatta	tgaaaagatg	gcaaacgcta	ataagggggc	tatgaccgaa	aatgccgatg	2460
aaaacgcgct	acagtctgac	gctaaaggca	aacttgattc	tgtcgctact	gattacgggtg	2520
ctgctatcga	tggtttcatt	ggtgacgttt	ccggccttgc	taatggtaat	ggtgctactg	2580
gtgattttgc	tggctctaata	tcccaaattg	ctcaagtcgg	tgacgggtgat	aattcacctt	2640
taatgaataa	ttcccgtaaa	tatttacctt	ccctccctca	atcggttgaa	tgtcgccctt	2700
ttgtcttttag	cgctggtaaa	ccatatgaat	tttctattga	ttgtgacaaa	ataaacttat	2760
tcggtggtgt	ctttgcgttt	cttttatatg	ttgccacctt	tatgtatgta	ttttctacgt	2820
ttgctaacat	actgcgtaat	aaggagtctt	aatcatgcc	gttcttttgg	gtattccggt	2880
attattgctg	ttcctcggtt	tccttctggt	aactttgttc	ggctatctgc	ttacttttct	2940
taaaaagggc	ttcggttaaga	tagctattgc	tatttcattg	tttcttgctc	ttattattgg	3000
gcttaactca	attcttgtgg	gttatctctc	tgatattagc	gctcaattac	cctctgacct	3060
tgttcagggt	gttcagttaa	ttctcccgct	taatgcgctt	ccctgttttt	atgttatctt	3120
ctctgtaaa	gctgctattt	tcatttttga	cgttaaacaa	aaaatcggtt	cttatttggg	3180
ttgggataaa	taatattggc	gtttattttg	taactggcaa	attaggtctc	ggaaagacgc	3240
tcgttagcgt	tggtaagatt	caggataaaa	ttgtagctgg	gtgcaaaaata	gcaactaatc	3300
ttgatttaag	gcttcaaaaac	ctcccgcaag	tcgggaggtt	cgctaaaacg	cctcgcggtt	3360
ttagaatacc	ggataagcct	tctatatctg	atttgcttgc	tattgggcgc	ggtaatgat	3420
cctacgatga	aaataaaaaac	ggcttgcttg	ttctcgatga	gtgcggtaact	tggtttaata	3480
ccggttcttg	gaatgataag	gaaagacagc	cgattattga	ttgggttctc	catgctcgta	3540
aattaggatg	ggatattatt	tttcttggtc	aggacttatc	tattgttgat	aaacaggcgc	3600
gttctgcatt	agctgaacat	gttggtttatt	gtcgtcgtct	ggacagaatt	actttacctt	3660
ttgtcggtac	tttatattct	cttattactg	gctcgaaaat	gcctctgcct	aaattacatg	3720
ttggcggtgt	taaatatggc	gattctcaat	taagccctac	tgttgagcgt	tggctttata	3780
ctggttaagaa	tttgataaac	gcataatgata	ctaaacaggc	ttttctagt	aattatgatt	3840
ccggtgttta	ttcttattta	acgccttatt	tatcacacgg	tcggtatttc	aaaccattaa	3900
atthtaggtca	gaagatgaaa	ttaactaaaa	tatatthgaa	aaagttttct	cgcggttctt	3960
gtcttgcgat	tggatttgca	tcagcattta	catatagtta	tataacccaa	cctaagccgg	4020
agggttaaaaa	ggtagtctct	cagacctatg	atthtgataa	attcactatt	gactcttctc	4080
agcgtcttaa	tctaagctat	cgctatgttt	tcaaggattc	taagggaata	tttaattata	4140
gcgacgattt	acagaagcaa	ggttattcac	tcacatatat	tgatttatgt	actgtttcca	4200
ttaaaaaagg	taattcaaata	gaaattgtta	aatgtaatga	atthtggttt	cttgatgttt	4260
gtttcatcat	cttcttttgc	tcaggtaatt	gaaatgaata	attcgctctc	gcgcgatttt	4320
gtaacttggt	attcaaagca	atcaggcgaa	tccgttattg	tttctcccga	tgtaaaagg	4380
actgttactg	tatattcatc	tgacgttaaa	cctgaaaatc	tacgcaattt	ctttatttct	4440
gttttacgtg	ctaataattt	tgatatggtt	ggttcaattc	cttccataat	tcagaagtat	4500
aatccaaaca	atcaggatta	tattgatgaa	ttgccatcat	ctgataatca	ggaatatgat	4560
gataattccg	ctccttctgg	tggtttcttt	gttccgcaaa	atgataatgt	tactcaaact	4620
tttaaaatta	ataacgttcg	ggcaaaggat	ttaatacgag	ttgtcgaatt	gtttgtaaag	4680
tctaataactt	ctaaatcctc	aaatgtatta	tctattgacg	gctctaactc	attagttgtt	4740

```

agtgcaccta aagatatattt agataacctt cctcaattcc tttctactgt tgatttgcca 4800
actgaccaga tattgattga ggggttgata tttgaggttc agcaagggtga tgcttttagat 4860
ttttcatttg ctgctggctc tcagcgtggc actgttgtag gcggtgttaa tactgaccgc 4920
ctcacctctg ttttatcttc tgctgggtgg tcgttcggta tttttaatgg cgatgtttta 4980
gggctatcag ttcgcgcatt aaagactaat agccattcaa aaatattgtc tgtgccacgt 5040
attcttacgc tttcagggtca gaaggggtct atctctgttg gccagaatgt cccttttatt 5100
actggtcgtg tgactgggtg atctgccaat gttaaataatc catttcagac gattgagcgt 5160
caaaaatgtg gtattttccat gagcgttttt cctgttgcaa tggctggcgg taatattgtt 5220
ctggatatta ccagcaaggc cgatagtttg agttcttcta ctcaggcaag tgatgttatt 5280
actaatcaaa gaagtattgc tacaacggtt aatttgctg atggacagac tcttttactc 5340
gggtggcctca ctgattataa aaacacttct caagattctg gcgtaccgtt cctgtctaaa 5400
atccctttaa tcggcctcct gttagctccc cgctctgatt ccaacgagga aagcacgtta 5460
tacgtgctcg tcaaagcaac catagtacgc gccctgtagc ggcgcattaa gcgcggcggg 5520
tgtgtgtggt acgcgcagcg tgaccgctac acttgccagc gccctagcgc ccgtctcttt 5580
cgctttcttc ccttctcttc tcgccacgtt cgccggcttt ccccgctcaag ctctaaatcg 5640
ggggctccct ttagggttcc gatttagtgc tttacggcac ctcgacccca aaaaacttga 5700
tttgggtgat ggttcacgta gtgggccatc gccctgatag acggtttttc gccctttgac 5760
gttggagtc acgttcttta atagtggact cttgttccaa actggaacaa cactcaaccc 5820
tatctcgggc tattcttttg atttataagg gattttgccg atttcggaac caccatcaaa 5880
caggattttc gcctgctggg gcaaaccagc gtggaccgct tgcctgcaact ctctcagggc 5940
caggcgggtga agggcaatca gctgttgccc gtctcgtgg tgaaaagaaa aaccaccctg 6000
gcgcccaata cgcaaaccgc ctctccccgc gcgttgcccg attcattaat gcagctggca 6060
cgacagggtt cccgactgga aagcgggcag tgagcgcaac gcaattaatg tgagttagct 6120
cactcattag gcaccccagg ctttacactt tatgcttcg gctcgtatgt tgtgtggaat 6180
tgtgagcggg taacaatttc acacaggaaa cagctatgac catgattacg aattcgagct 6240
cggtagcccg ggatcctcta gagtcgacct gcaggcatgc aagcttgcca ctggccgtcg 6300
ttttacaacg tcgtgactgg gaaaaccctg gcgttaccga acttaatcgc cttgcagcac 6360
atcccccttt cgccagctgg cgtaatagcg aagaggcccc caccgatcgc ccttcccaac 6420
agttgcgcag cctgaatggc gaatggcgct ttgcctgggt tccggcacca gaagcgggtg 6480
cggaaagctg gctggagtgc gatcttcctg aggcgatac ggtcgtcgtc cctcaaaact 6540
ggcagatgca cggttacgat gcgccatct acaccaacgt aacctatccc attacggtca 6600
atccgcggtt tgttccacg gagaatccga cgggttgcta ctcgctcaca tttaattgtt 6660
atgaaagctg gctacaggaa ggccagacgc gaattatttt tgatggcgtt cctattggtt 6720
aaaaaatgag ctgatttaac aaaaatttaa cgcaatttt aacaaaatat taacgtttac 6780
aatttaaata tttgcttata caatcttctt gtttttgggg cttttctgat tatcaaccgg 6840
ggtacatatg attgacatgc tagttttacg attaccgttc atcgattctc ttgtttgctc 6900
cagactctca ggcaatgacc tgatagcctt tgtagatctc tcaaaaatag ctaccctctc 6960
cggcattaat ttatcagcta gaacgggtga atatcatatt gatggtgatt tgactgtctc 7020
cggcctttct cacccttttg aatctttacc tacacattac tcaggcattg catttaaaat 7080
atatgagggt tctaaaaatt tttatccttg cgttgaaata aaggtttctc ccgcaaaagt 7140
attacagggt cataatgttt ttggtacaac cgatttagct ttatgctctg aggcctttatt 7200
gcttaatttt gctaattctt tgccttgctt gtatgattta ttggatgtt 7249

```

```

<210> 2
<211> 15
<212> DNA
<213> Artificial Sequence

```

```

<220>
<223> Description of Artificial Sequence: Synthetic
       primer for nucleic acid production derived from
       M13mp18 sequence

```

```

<400> 2
agcaacacta tcata

```

<210> 3
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 3
acgacgataa aaacc

15

<210> 4
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 4
ttttgcaaaa gaagt

15

<210> 5
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 5
aatagtaaaa tgttt

15

<210> 6
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 6
caatactgcg gaatg

15

<210> 7
<211> 15

<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 7
tgaatccccc tcaaa

15

<210> 8
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 8
agaaaacgag aatga

15

<210> 9
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 9
caggtcttta ccctg

15

<210> 10
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 10
aggaaagcgg attgc

15

<210> 11
<211> 15
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 11

aggaagcccg aaaga

15

<210> 12

<211> 15

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 12

atatttgaag tcttt

15

<210> 13

<211> 15

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 13

tctttttgat gcaat

15

<210> 14

<211> 15

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 14

ctataataact caggg

15

<210> 15

<211> 15

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 15
tgatttatgg tcatt 15

<210> 16
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 16
gtttaaagca ttgga 15

<210> 17
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 17
tatttatgac gattc 15

<210> 18
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 18
tatccagtct aaaca 15

<210> 19
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from

M13mp18' sequence

<400> 19
ctctggcaaa acttc 15

<210> 20
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 20
tcgctatttt ggttt 15

<210> 21
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer for nucleic acid production derived from
M13mp18 sequence

<400> 21
aaacgagggt tatga 15

<210> 22
<211> 45
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
pIBI 31-BH5-2

<400> 22
atgaccatga ttacgccaga tatcaaatta atacgactca ctata 45

<210> 23
<211> 49
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
oligonucleotide

<400> 23
ctatagtgag tcgtattaat taagtactaa tgatatctgg cgtaatcat 49

<210> 24
 <211> 24
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 pIBI 31-BH5-2

<400> 24
 gggctccctt tagtgacggt taat

24

<210> 25
 <211> 45
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 pIBI 31 BSII/HCV

<400> 25
 atgaccatga ttacgccaaag ctcgaaatta accctcacta aaggg

45

<210> 26
 <211> 49
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic,
 oligonucleotide

<400> 26
 taattatgct gagtgatatt taagtactaa ttggcgtaat cataatcat

49

<210> 27
 <211> 21
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 pIBI 31 BSII/HCV

<400> 27
 ctatagtgag tccgtattaa t

21